**⊘**SciMedCentral

# Journal of Ear, Nose and Throat Disorders

#### Editorial

# The Challenge of Pediatric Vertigo

#### Chiarella G and Viola P\*

Department of Experimental and Clinical Medicine, University of Catanzaro "Magna Graecia", Italy

#### **EDITORIAL**

Balance disorders, vertigo and dizziness are not a rare occurrence in childhood, but received less attention than in the adult population.

There are many disorders that can cause dizziness in the pediatric population. The prevalence of vestibular disorders in the pediatric population ranges between 0.7% and 15%. This wide range is related to differences in study design, method of data collection, inclusion and exclusion criteria and correlate with source of data, (if from otologist, neurologist or pediatrician) [1-5].

The assessment of balance function is more complex in children than adults, due to several reasons.

First, children often lack the communication capacity to describe correctly their symptoms (true vertigo, unsteadiness, imbalance, light-headedness). The diagnosis is based less in history and more on the caregiver's observations and much more in clinical examination and laboratory investigations. On the other hand, some peripheral vestibular disorders may be very short-lived because of rapid compensation typical of this age, so that we can find really a small amount of signs helpful for diagnosis.

Secondly, symptoms of dizziness can manifest differently in children than in adults, particularly in young children. Vestibular disorders are often ignored at this age, because vertiginous manifestations are usually attributed to lack of coordination or behavioral problems [6]. In children, symptoms and signs that may indicate vestibular dysfunction are often not specific, including impaired spatial relationships, also revealed by reading skipping words or letters, or by writing with an irregular style; visual acuity problems, particularly with head movements; difficulty gait in the darkness; developmental and reflex delays revealed by slower achievement of milestones such as riding a bicycle, swimming, stair climbing; abnormal movement patterns, clumsiness or poor posture, tendency to fall; motion sickness or sensitivity; headaches, nausea [7].

Finally, although most diseases that cause vertigo in adulthood occur also in childhood, their frequency is different, depending on the age of the patient. The most representative example is benign paroxysmal positional vertigo (BPPV), which is the most frequent cause of vertigo in adults, but is not common

#### \*Corresponding author

Pasquale Viola, Department of Experimental and Clinical Medicine, Audiology and Phoniatrics Unit, University of Catanzaro Magna Graecia, Loc Germaneto 88100, Catanzaro, Italy, Tel/Fax: 39-0961-3647-202; Email: pasqualeviol@libero.it

Submitted: 31 July 2017 Accepted: 31 July 2017 Published: 31 July 2017 ISSN: 2475-9473 Copyright © 2017 Viola et al. OPEN ACCESS

in children [1]. In contrast, common diseases causing vertigo in children, may be unique at this age, such as benign paroxysmal vertigo of childhood (BPVC) [8]. Moreover, the prevalence of different pathologies appears to change considerably as child's age increases (i.e. somatoform disorders are more common in adolescence than in younger children).

Vestibular dysfunction at this time of life can have a major impact on a child's development; it may result in delayed postural control, episodic vertigo, lack of coordination, and the development of paroxysmal head tilt in young patients. In childhood, the great neural plasticity could explain a better tolerability to vertigo, with shorter duration of symptoms and, often, a relatively self-limiting character of the syndrome, compared with adults. However, vertigo, at this age, must be given ample consideration, as it can be the only symptom of a broad spectrum of diseases, that can include inner ear malformations and central nervous system tumors.

The most commonly diagnosed vestibular disease in children is migraine associated vertigo (MV), responsible for nearly 25% of cases in a study of more than 2000 patients. BPVC represents 20% of the diagnoses. Cranial trauma and ophthalmological disorders each accounted for 10% of dizziness causes. Vestibular neuritis (VN) and posterior fossa tumors were less often encountered (<1%) [3]. A more recent review confirmed this distribution with little differences: vestibular migraine (VM) (27.82%), BPVC (15,68%) were the two main entities connected with balance disorders in children. VN (9.81%) and psychogenic disorders (8.28%) are frequent entities, followed by middle ear effusion and otitis media (4.1%), Menière's disease (MD) (4.08%), head trauma (3.82%), while BPPV and orthostatic hypotension are rare in childhood [1]. Our personal experience superimposes these reports.

Mostly at this age, the differential diagnostic process is a complicated challenge that involves various specialty including otologist, neurologist, pediatrician, psychiatrists, ophthalmologist, etc.

In our practice, almost all balance tests can be performed on children from the age of one year, by specialists adequately trained, with minimal precaution. There is more variability in the

## ⊘SciMedCentral

range of normal at pediatric age. Clinical examination of balance function must explore the three major sensory systems that contribute to this function: the visual system, vestibular system, and somatosensory system. In particular, the vestibular system is anatomically developed and functionally responsive by birth, although vestibular responses can be variable [9]. Neuronal circuits for ocular motor and vestibular function develop already within the first year of life, so that can be reliably tested already in toddlers. The majority of normal children demonstrate vestibular responses to caloric and rotational stimuli by age 2 months. By age 10 months, the absence of vestibule-ocular reflex (VOR) responses can be considered abnormal, but lack of a response in a child less than 6 months of age is not necessarily abnormal [10].

The head-impulse test for horizontal VOR function is easily performed. Video-oculography systems allow quantification of VOR gains and are well tolerated. If necessary, responses to caloric irrigation of the ears have been successfully recorded in normal children as young as 1 year of age. If the objective is to determine the presence or absence of vestibular function, rotational testing may be more convenient under the age of three, and are easily performed also with small children sitting in a parent's lap during the rotational chair testing, with the advantage that vertigo is less intense in rotational chair testing than during caloric stimulation. Body sway can be quantified by posturography. Systems based on accelerometers are preferred to force platforms because of children's low body weight [10,11]. We applied Vestibular evoked miogenic potentials (VEMPs) recording also in 5 years old childrens with helpful informations. Brain Magnetic Resonance Imaging (MRI) should be considered in all patients with central vestibular signs to exclude central pathologies.

Vertigo in children frequently creates a deep sense of apprehension both in parents and physicians that lead to a disproportionate number of prescriptions for functional testing and imaging examinations that are often inappropriate for a correct therapeutic approach. In recent literature, some Authors proposed validate algorithms that could represent a good tool for guiding clinical suspicion to correct diagnostic assessment in dizzy children, based on different clinical factors: temporal features of vertigo, presence of hearing impairment, traumatic suspect, neurological signs [1,12,13].

Vertigo and dizziness are not rare in children. The pathologies behind these symptoms can be missed for a long time and could interfere with the psychological and physical development of the child. This lead us to emphasize the role of the physician to aid in rapid diagnosis and appropriate treatments. Consequently pediatricians and neuro-otologists should be aware of the full spectrum of causes of vertigo and dizziness in children and adolescents. We highlight the urgent need of specific formation and adequate diffusion of knowledge about balance problems in pediatric population that requires specific approaches for diagnosis and treatment.

### REFERENCES

- 1. Gioacchini FM, Alicandri-Ciufelli M, Kaleci S, Magliulo G, Re M. Prevalence and diagnosis of vestibular disorders in children: a review. Int J Pediatr Otorhinolaryngol. 2014; 78: 718-724.
- 2. Bower CM, Cotton RT. Cotton. The spectrum of vertigo in children. Arch. Otolaryngol. Head Neck Surg. 1995; 121: 911–915.
- 3. Wiener-Vacher SR. Vestibular disorders in children. Int J Audiol. 2008; 47: 578-583.
- 4. O'Reilly RC, Morlet T, Nicholas BD, Josephson G, Horlbeck D, Lundy L, et al. Prevalence of vestibular and balance disorders in children. Otol Neurotol. 2010; 31: 1441-1444.
- Jahn K, Langhagen T, Heinen F. Vertigo and dizziness in children. Curr Opin Neurol. 2015; 28: 78-82.
- 6. Tusa RJ, Saada Jr. AA, Niparko JK. Dizziness in childhood. J. Child Neurol. 1994; 9: 261-274.
- 7. Rine RM. Growing evidence for balance and vestibular problems in children. Aud Med. 2009; 7: 138–142.
- 8. Drigo P, Carli G, Laverda AM. Benign paroxysmal vertigo of childhood. Brain Dev. 2001; 23: 38-41.
- Nandi R, Luxon LM. Development and assessment of the vestibular system. Int J Audiol. 2008; 47: 566-577.
- 10. Fife TD, Tusa RJ, Furman JM, Zee DS, Frohman E, Baloh RW, et al. Assessment: Vestibular testing techniques in adults and children: Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. Neurology. 2000; 55: 1431-1441.
- 11. Jahn K, Langhagen T, Schroeder AS, Heinen F. Vertigo and dizziness in childhood – update on diagnosis and treatment. Neuropediatrics. 2011; 42: 129-134.
- 12. Casani AP, Dallan I, Navari E, Sellari Franceschini S, Cerchiai N. Vertigo in childhood: proposal for a diagnostic algorithm based upon clinical experience. Acta Otorhinolaryngol Ital. 2015; 35: 180-185.
- 13. Ravid S, Bienkowski R, Eviatar L. A simplified diagnostic approach to dizziness in children. Pediatr Neurol. 2003; 29: 317-320.

#### **Cite this article**

Chiarella G, Viola P (2017) The Challenge of Pediatric Vertigo. J Ear Nose Throat Disord 2(3): 1027.